



**IN THE UNITED STATES PATENT & TRADEMARK OFFICE  
BOARD OF PATENT APPEALS AND INTERFERENCES**

Application Number : 10/533,314 Confirmation No. 4747  
Applicant : Simon Richard STEBBING et al.  
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Examiner : Nicholas P. D'Aniello  
Entitled : STABILISED ALUMINOSILICATE SLURRIES

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**MAIL STOP APPEAL BRIEF - PATENTS**

Commissioner for Patents  
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**APPEAL BRIEF**

Sir:

This Appeal Brief is filed under 37 C.F.R. § 41.37 pursuant to the Notice of Appeal filed on September 25, 2008 and in response to the Final Office Action mailed on June 25, 2008.

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**I. REAL PARTY IN INTEREST**

The real party in interest is Ineos Silicas Limited, Hampshire, United Kingdom. Ineos Silicas Limited assigned the rights in U.S. Patent Application No. 10/533,314 to PQ Silicas UK Limited in June 2008.

**II. RELATED APPEALS AND INTERFERENCES**

There are no other appeals, interferences, or judicial proceedings known to Appellants, Appellants' legal representative or assignee, which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**III.     STATUS OF CLAIMS**

Claims 1-12 are pending. Claims 1-12 have been finally rejected. The rejections of claims 1-12 are being appealed.

**IV. STATUS OF AMENDMENTS**

No amendments have been filed subsequent to the final rejection.

**V. SUMMARY OF CLAIMED SUBJECT MATTER**

The claimed inventions relate to aqueous slurries, such as, aqueous slurries of crystalline aluminosilicates and crystalline aluminosilicate slurries having controlled rheological properties. Claim 1 is the sole independent claim.

Claim 1 is directed to an aqueous slurry. The aqueous slurry comprises a crystalline aluminosilicate represented by the empirical formula  $M_{2/n}O-Al_2O_3-xSiO_2-yH_2O$  (see, e.g., page 1, lines 18-20, of the original specification). In the empirical formula, M represents a first metal moiety having a valency of n, x indicates the ratio of molecules of silica to molecules of alumina, and y indicates the ratio of molecules of water to molecules of alumina (see, e.g., page 1, lines 21-23 and lines 32-34 of the original specification). The aqueous solution also comprises a salt of a second metal selected from the group consisting of Group III metals, metallic elements of Group IV, magnesium, titanium, chromium, iron, nickel, copper, zinc, zirconium and silver (see, e.g., page 1, lines 24-26 of the original specification). The salt of a second metal is present in an amount which is sufficient to replace from about 2.0 to about 40 per cent by weight of the first metal moiety (see, e.g., page 1, lines 26-28 of the original specification). The aqueous solution also comprises particulate silica having a BET surface area greater than 500 m<sup>2</sup>/g and a pore volume, as measured by nitrogen manometry of less than 2.1 cm<sup>3</sup>/g (see, e.g., page 1, lines 29-30 of the original specification).

**VI. GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

Claims 1-12 stand rejected under 35 U.S.C. § 103(a) over International Publication No. WO 01/94512 ("Araya") in view of U.S. Patent No. 5,478,500 ("Swift") and International Publication No. WO 00/12669 ("Aldcroft"). This rejection of claims 1-12 is now appealed.



## VII. ARGUMENT

### A. Relevant Law on Obviousness

The Patent Office bears the burden of establishing a *prima facie* case of obviousness under 35 U.S.C. § 103(a). A finding of obviousness requires that "the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." 35 U.S.C. § 103(a). In its recent decision addressing the issue of obviousness, *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1734 (2007), the Supreme Court stated that the following factors set forth in *Graham v. John Deere Co.*, 383 U.S. 1 (1966) still control an obviousness inquiry: (1) the scope and content of the prior art; (2) the differences between the prior art and the claimed invention; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness. As the Court in *KSR* stated, the key to supporting any rejection under 35 U.S.C. § 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious - the analysis supporting a rejection under 35 U.S. C. § 103 should be made explicit. The Federal Circuit has stated that "rejections on obviousness cannot be sustained with mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). See also, M.P.E.P. § 2142.

Section 2143 of the M.P.E.P. sets forth various rationales by which the Office, following *KSR*, may set forth a *prima facie* case of obviousness. While the various rationales differ in specificity, each still places the burden squarely upon the Examiner to produce evidence sufficient to form a *prima facie* case. If the Examiner fails to set forth such evidence, the Applicant is under no obligation to set forth rebuttal evidence of nonobviousness. See M.P.E.P. § 2142.

**B. Claims 1-12 are Patentable Over the Combination of Araya, Swift, and Aldcroft**

The Examiner's rejection of claims 1-12 should be reversed because Araya, Swift, and Aldcroft do not, either singly or in combination, teach, suggest, or describe the claimed aqueous slurry.

*1. The Office Failed to Submit Sufficient Rationale to Support a Prima Facie Case of Obviousness*

Preliminarily, Applicants note that the Examiner acknowledges that Araya does not teach the required component (c) of claim 1 of the present invention ("particulate silica having a BET surface area greater than 500 m<sup>2</sup>/g and a pore volume, as measured by nitrogen manometry of less than 2.1 cm<sup>3</sup>/g"), and therefore, must rely upon Swift, in combination with Aldcroft, to teach this component.

As discussed in the Field of Invention, Swift discusses a detergent composition in the form of *solid agglomerates* rather than spray dried granules (see col. 1, line 14-32 of Swift). These solid agglomerates<sup>1</sup> were designed to have improved solubility in cold temperature laundering solutions. Thus, upon first review, Applicants immediately note that, unlike the compositions of the present invention which comprise *liquid aqueous aluminosilicate slurries*, the detergent compositions of Swift comprise *solid agglomerates*.

More specifically, the solid agglomerate detergent compositions described in Swift, comprise:

a *surfactant system* having a high level of a sulfated surfactant...in combination with optimum levels of amine oxide surfactant and linear alkylbenzene sulfonate surfactant.

(see col. 2, line 67 – col. 3, line 5, emphasis added). In fact, Swift attributes the overall surfactant system as the source for the observed *improvements in solubility* of the solid

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<sup>1</sup> The term, "agglomerates", is defined by Swift as: "particles formed by agglomerating particles which typically have a smaller mean particle size than the formed agglomerates" (See col. 3, line 20-23 of Swift).

agglomerate detergent compositions (in cold temperatures washing solutions, as well as under high water hardness conditions; see col. 4, line 61 – col. 5, line 14).

In Step D of the Agglomeration Process, Swift admixes zeolites with the solid agglomerate particles. Once the desired mean agglomerate particle size (see col. 13, line 17-35) are produced, then particulate silica (Swift uses the term “precipitated silica”) is added as a “flow-aid” to coat the solid agglomerate particles, thereby reducing the caking/lumping tendency of the solid particles and maintaining acceptable *flowability* [of the solid agglomerate particles] sSee col. 13, line 18-22). Conceptually, Swift’s addition of silica to coat the solid agglomerate particles, is much like why the baker uses flour to coat the batter, to improve the handling of the solid material.

Thus, Applicants submit that it is clear to one skilled in the art that Swift utilized particulate silica as a “flow-aid” to improve the “flowability”, *i.e.*, the mixing of the solid agglomerate particles. Swift discusses that these solid agglomerates tend to cake/lump together. Accordingly, the coating with particulate silica is only added as a “flow-aid” to produce free-flowing solid particles.

In contrast to Swift, the compositions of the present invention comprise liquid aqueous aluminosilicate slurries. Specifically, the aqueous slurry compositions of the present invention, comprise: a crystalline aluminosilicate [component (a)], a salt of a second metal [component (b)], and particulate silica [component (c)]. Importantly, liquid aqueous aluminosilicate slurries that comprised the required particulate silica [component (c)] were stable on storage and had *reduced viscosity*<sup>2</sup> (low shear rate) – a surprising and unexpected result (see Table below, excerpted from Table 2 of the instant application).

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<sup>2</sup> Viscosity is defined as: the internal resistance to flow exhibited by a fluid; the ratio of shearing stress to rate of shear. To determine kinematic viscosity, the time is measured for an exact quantity of liquid to flow by gravity through a standard capillary (See Hawley’s Condensed Chemical Dictionary, 14<sup>th</sup> Ed., Richard J. Lewis, Sr., John Wiley & Sons, Inc., New York, 2001).

		SAMPLE	
		(A) Control (Araya)	(B) Present Invention (1% silica)
<b>Viscosity at 20 s<sup>-1</sup> (Pa s)</b>	<b>Initially</b>	<b>0.55</b>	<b>0.06</b>
	<b>After 4 days</b>	<b>0.58</b>	<b>0.06</b>
	<b>After 24 days</b>	<b>0.62</b>	<b>0.15</b>
	<b>After 60 days</b>	<b>0.69</b>	<b>0.25</b>

The shear rate of 20 sec<sup>-1</sup> is a shear rate that corresponds to the approximate shear value experienced by a slurry when it is poured or discharged from a tank. It is common in the industry to measure such a shear rate in order to obtain information concerning the “pourability” of a liquid – the lower the viscosity at such a shear rate, the easier it is to pour or dispense the liquid. The time scale involved with such a shear rate is 1/20<sup>th</sup> of a second.

Hence, when considering the data, it should be understood that the lower the viscosity is at 20 sec<sup>-1</sup>, the better the expected dispensing behavior of the slurry (*i.e.*, easier dispensing).

With regard to the settling out of particulate zeolite from the slurry, this will depend upon the viscosity of the liquid as measured at much lower shear rates. As particles typically settle out over several weeks (10<sup>6</sup> seconds or more), the relevant shear rate at which the viscosity should be measured is of the order 10<sup>-6</sup> sec<sup>-1</sup>.

In practice, measurement of viscosity at such low shear rates is fraught with experimental difficulties, and so it is usual to monitor settling out of slurries by direct assessment of the slurry on storage over several weeks or months.

In Example 1 of the application as filed (see table above), comparison of sample B (according to the invention) vs. sample A (as in Araya) shows that the addition of the required silica (component (c) of claim 1 of the pending claims) to the zeolite slurry markedly lowers the viscosity of the slurry at 20 sec<sup>-1</sup> (0.06 vs. 0.55 initially; sample B vs. sample A, respectively). On storage, it is known that slurries may become thicker, but even after 60

days of storage, the sample according to the invention still has better pourability than the prior art slurry (0.25 vs. 0.69).

However, a reduction in the viscosity at  $20 \text{ sec}^{-1}$  would be of little value if it also resulted in a corresponding reduction in viscosity at very low shear rates (such as  $10^{-6} \text{ sec}^{-1}$ ) because this would lead to unacceptable settling out of particulate solids from the slurry on transport or storage, clogging storage vessels and tankers.

On page 7, at lines 3 to 4 of the instant application, it is clear that storage experiments indicate that the slurry of the invention has no significant difference in sedimentation behaviour when compared to the prior art slurry.

The is extremely surprising: it would be expected by the skilled person in the field that a reduction in viscosity at the pouring shear rate ( $20 \text{ sec}^{-1}$ ) would be present across all shear rates, leading to a similar reduction in viscosity at very low shear rates and a consequent loss of stability against sedimentation.

Turning to Examples 2 and 3 of the instant application, similar results are yielded by slurries with lower aluminium sulphate contents and when other salts are present in the slurry replacing aluminium sulphate.

Hence, starting from the problematic slurries of Araya, the technical problem that has been addressed by the invention is the provision of an additive that will improve the dispensability of the slurry **without** consequently destroying the stability of the slurry against separation by sedimentation.

The Examiner asserts that Swift is combinable with Araya because it is in the same field of endeavour as the present application (detergent compositions). However, it is submitted that there is no motivation in Swift to utilize silica to modify the viscosity of concentrated liquid, aqueous aluminosilicate slurries. Applicants submit that the Examiner lacks support for linking the reduction of the physical "stickiness" ("flowability") property of solid compositions (as in Swift) to the modification of viscosity characteristics of liquid,

aqueous aluminosilicate slurry compositions (as in the present invention). The use of particulate silica to aid in mixing solids does not teach, nor suggest, that an aqueous aluminosilicate slurry composition, comprising particulate silica, would result in a reduction in viscosity.

After misapplying Swift (see above), the Examiner then relies on Aldcroft for providing a teaching of the required BET surface area and pore volume for the silica (c), which is missing from Swift. Applicants respectfully submit that the above noted deficiencies of Swift are not cured by the teachings of Aldcroft.

Aldcroft is actually concerned with a porous solid granule which is of use for carrying perfume in a detergent powder in a non-sticky form, and which disintegrates when the detergent powder is added to water for use in a washing machine (see the abstract of Aldcroft and the introduction to the description of Aldcroft).

There is no teaching whatsoever in Aldcroft that the silica mentioned therein would have any effect on the viscosity of concentrated zeolite slurries. Although the powder granules of Aldcroft are ultimately intended to be dispersed in water as part of a washing composition, such a composition would be a very dilute slurry, and so of no relevance to the present invention, and moreover, Aldcroft makes no teaching concerning the effect of the silica on the viscosity of such a slurry.

It seems that the Examiner has taken the word "flow-aid" as applied to the use of silica in sticky, solid granular powders and taken this as a teaching to use silica as a "flow-aid" in high concentration aqueous zeolite slurries. The physics of solid granular flow of powders is very different from the viscous behaviour of slurries of colloidal particles, and the skilled person would not consider the use of the term "flow-aid" in a solid granular flow context as motivation to use the "flow-aid" as a viscosity modifier to reduce viscosity at 20  $\text{sec}^{-1}$  without loss in stability at very low shear rates for a colloidal slurry.

Furthermore, the Applicants submit that the Examiner's assertion, that it would be obvious to one of skill in the art to modify Swift by relying on Aldcroft and both in combination with Araya (none of which discuss the use of particulate silica to reduce viscosity) to tackle a viscosity problem, amounts to nothing more than an impermissible hindsight rejection.

Accordingly, the solid granular detergent compositions of Swift comprise an overall surfactant system (not particulate silica) to improve solubility properties when, at some later point, the solid, granular detergent composition is placed in water. In direct contrast, the compositions of the present invention comprise liquid, aqueous aluminosilicate slurries, comprising the required component (c), particulate silica (having a specific surface area and pore volume), to reduce viscosity properties.

**VIII. CONCLUSION**

For all of the reasons set forth above, the rejection of claims 1-12 should be reversed and claims 1-12 should be allowed.

Respectfully submitted,

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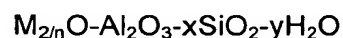
Attachments: Appendix A – Claims  
Appendix B – Evidence  
Appendix C – Related Proceedings



**APPENDIX A – CLAIMS**

1. (Previously Presented) An aqueous slurry comprising

(a) a crystalline aluminosilicate represented by the empirical formula



wherein M represents a first metal moiety, said first metal having a valency of n, x indicates the ratio of molecules of silica to molecules of alumina and y indicates the ratio of molecules of water to molecules of alumina,

(b) a salt of a second metal selected from the group consisting of Group III metals, metallic elements of Group IV, magnesium, titanium, chromium, iron, nickel, copper, zinc, zirconium and silver, said salt of a second metal being present in an amount which is sufficient to replace from about 2.0 to about 40 per cent by weight of the first metal moiety, and

(c) particulate silica having a BET surface area greater than 500 m<sup>2</sup>/g and a pore volume, as measured by nitrogen manometry of less than 2.1 cm<sup>3</sup>/g.

2. (Previously Presented) An aqueous slurry according to claim 1 wherein M is sodium.

3. (Previously Presented) An aqueous slurry according to claim 1 wherein the crystalline aluminosilicate is a zeolite P, zeolite A or zeolite X.

4. (Previously Presented) An aqueous slurry according to claim 1 wherein the second metal is aluminium, zirconium or tin.

5. (Previously Presented) An aqueous slurry according to claim 1 wherein it has a pH in the range 6 to 9.

6. (Previously Presented) An aqueous slurry according to claim 1 wherein the crystalline aluminosilicate has a volume average particle size in the range 0.1 to 20  $\mu\text{m}$ .
7. (Previously Presented) An aqueous slurry according to claim 1 wherein the amount of crystalline aluminosilicate present in the slurry is in the range 20 to 50 per cent by weight calculated as dry aluminosilicate.
8. (Previously Presented) An aqueous slurry according to claim 1 wherein the silica has a BET surface area greater than 600  $\text{m}^2/\text{g}$ .
9. (Previously Presented) An aqueous slurry according to claim 1 wherein the silica has a pore volume of less than 1.2  $\text{cm}^3/\text{g}$ .
10. (Previously Presented) An aqueous slurry according to claim 1 wherein the silica has a volume average particle size in the range 0.5 to 30  $\mu\text{m}$ .
11. (Previously Presented) An aqueous slurry according to claim 1 wherein the amount of silica present in the slurry is in the range 0.2 to 40 per cent by weight with respect to dry weight of crystalline aluminosilicate present.
12. (Previously Presented) An aqueous slurry according to claim 1 in which the metal salt is a halide, a nitrate or a sulphate.

**APPENDIX B – EVIDENCE**

None.

**APPENDIX C – RELATED PROCEEDINGS**

None.